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| 10/046,284 | 01/16/2002 | Joseph P. Kennedy JR. | GRA26 884 | 2367 |

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| EXAMINER | |
|---|---|
| ADDY, ANTHONY S | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2681 | 7 |

DATE MAILED: 08/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/046,284 | KENNEDY ET AL. | |
| | Examiner | Art Unit | |
| | Anthony S Addy | 2681 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *16 January 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 January 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Information Disclosure Statement*

1. The information disclosure statement filed on January 16, 2002 fails to comply with 37 CFR 1.98(a)(1), which requires a list of all patents, publications, or other information submitted for consideration by the Office. It has been placed in the application file, but the information referred to therein has not been considered.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-3, 5-6,10,12-16 and18-21 are rejected under 35 U.S.C. 102(b) as being anticipated by **Hawkes et al., U.S. Patent Number 5,973,643 (hereafter Hawkes).**

Regarding claim 1, Hawkes teaches a wireless communication system having plural base stations (see col. 5, lines 10-11) defining a signal coverage area for communication with a mobile-appliance located within the coverage area (see col. 2, lines 37-39), a method of determining the position within the coverage area of mobile-appliance location determining sensors (see col. 8, line 52 – col. 9, line 10, col. 10, lines 41-46 and col. 11, lines 33-51), comprising the steps of: determining for each of the plural base stations the capability to receive

signals from a mobile appliance (see col. 4, lines 5-16); estimating the transmit power level of the mobile appliance at a selected geographic point in the coverage area (see col. 8, lines 12-18); estimating for each of the plural base stations, the strength of a signal from the mobile-appliance transmitted at the estimated power level from the selected geographic point (see col. 3, lines 38-52); identifying each of the plural base stations estimated to receive a signal above a predetermined threshold from the mobile-appliance (see col. 9, lines 22-32); estimating the accuracy of a calculated position of the mobile-appliance from the estimate of the signal strength received at the identified base stations (see col. 3, lines 1-4 and col. 4, lines 26-43), determining the position of mobile-appliance location determining sensors in the coverage area needed to provide the estimated location determining accuracy within a predetermined threshold (see col. 8, line 52 – col. 9, line 10, col. 10, lines 41-46 and col. 11, lines 33-51).

Regarding claim 2, Hawkes discloses all the limitations of claim 1. In addition, Hawkes teaches a method wherein the determined capability of the plural base stations to receive signals is a function of the geographic location of the base stations (see col. 3, lines 49-52), the height of the base station, the number of sectors (see col. 11, lines 1-2), the orientation of the sectors (see col. 11, lines 2-4), the power management architecture of the communication system (see col. 8, lines 12-18), and the antenna characteristics (see col. 1, lines 38-42).

Regarding claim 3, Hawkes teaches all the limitations of claim 1. In addition, Hawkes teaches a method, wherein the estimated transmit power level

is a function of an estimated signal propagation and the determined capability of the plural base stations to receive signals (see col. 8, lines 12-18).

Regarding claim 5, Hawkes teaches all the limitations of claim 1. In addition, Hawkes teaches a method, wherein the estimated strength of the signal received at the plural base stations is a function of the transmit power level and estimated signal propagation (see col. 8, lines 12-18).

Regarding claim 6, Hawkes teaches all the limitations of claim 1. In addition, Hawkes teaches a method, wherein the estimated accuracy is a function of the estimated strength of the signal received at the plural base stations (see col. 11, lines 48-51), the determined capability of the plural base stations to receive signals and a capability of the mobile-appliance location determining sensors (see col. 2, lines 37-56).

Regarding claim 10, Hawkes teaches all the limitations of claim 1. In addition, Hawkes teaches a method, wherein the estimated accuracy of the position of the mobile-appliance is estimated for plural selected geographic points in the coverage area (see col. 3, lines 44-52).

Regarding claim 12, Hawkes teaches all the limitations of claim 1. In addition, Hawkes teaches a method, wherein the step of estimating the accuracy of the position of the mobile-appliance includes the step of estimating a time difference of arrival (TDOA) error between the identified base stations (see col. 3, lines 38-44).

Regarding claim 13, Hawkes teaches all the limitations of claim 1. In addition, Hawkes teaches a method, wherein the step of estimating the accuracy

position of the mobile-appliance includes the step of estimating an angle of arrival (AOA) error at the identified base stations (see col. 3, lines 38-44).

Regarding claim 14, Hawkes teaches all the limitations of claim 1. In addition, Hawkes teaches a method, wherein the step of estimating the accuracy of the position of the mobile-appliance includes the step of estimating a collateral data generated error (see col. 3, lines 1-4 and col. 20, lines 27-64).

Regarding claim 15, Hawkes teaches all the limitations of claim 6. In addition, Hawkes teaches a method, wherein the estimated accuracy of the position of the mobile-appliance is a function of a collateral data generated error (see col. 20, lines 42-64).

Regarding claim 16, Hawkes teaches a system for determining the position area of mobile-appliance location determining sensors in a mobile-appliance communication system having plural base stations defining a signal coverage area (see col. 8, line 52 – col. 9, line 10, col. 10, lines 41-46 and col. 11, lines 33-51) comprising: means for determining for each of the plural base stations the capability to receive signals from a mobile appliance (see col. 4, lines 5-16); means for estimating the transmit power level of the mobile appliance at a selected geographic point in the coverage area (see col. 8, lines 12-18); means for estimating for each of the plural base stations, the strength of a signal from the mobile-appliance transmitted at the estimated power level from the selected geographic point (see col. 3, lines 38-52); means for identifying each of the plural base stations estimated to receive a signal above a predetermined threshold from the mobile-appliance (see col. 9, lines 22-32); means for estimating the

accuracy of the calculated position of the mobile-appliance from the estimate of the signal strength received at the identified base stations (see col. 3, lines 1-4 and col. 4, lines 26-43); and means for determining the position of mobile-appliance location determining sensors in the coverage area needed to provide the estimated location determining accuracy within a predetermined threshold (see col. 8, line 52 – col. 9, line 10, col. 10, lines 41-46 and col. 11, lines 33-51).

Regarding claim 18, Hawkes teaches a mobile-appliance communications system with plural base stations (see col. 5, lines 10-11), a method of positioning location sensors for determining the location of a mobile-appliance within a predetermined accuracy (see col. 8, line 52 – col. 9, line 10, col. 10, lines 41-46 and col. 11, lines 33-51), wherein the location determining sensors are positioned at some but not all of the base stations based on an estimated accuracy of the location calculated by the location determining sensors (see col. 5, lines 22-25 and col. 10, lines 39-46) and the costs of the location determination sensors (see col. 4, lines 9-25).

Regarding claim 19, Hawkes teaches a mobile-appliance communication system with plural base stations defining a signal coverage area (see col. 5, lines 10-11), a method of positioning location sensors for determining the location of a mobile-appliance within a predetermined accuracy (see col. 8, line 52 – col. 9, line 10, col. 10, lines 41-46 and col. 11, lines 33-51), wherein the location determining sensors are positioned based on minimizing the number of sensors required for the coverage area (see col. 9, lines 1-49).

Regarding claim 20, Hawkes discloses all the limitations of claim 19. In addition, Hawkes discloses a method, wherein the location determining sensors are positioned as a function of a selected capability of the sensor (see col. 9, lines 1-10).

Regarding claim 21, Hawkes teaches a mobile-appliance communication system with plural base stations (see col. 5, lines 10-11), a method of positioning location sensors for determining the location of a mobile-appliance within a predetermined accuracy (see col. 8, line 52 – col. 9, line 10, col. 10, lines 41-46 and col. 11, lines 33-51), wherein the location determining sensors are positioned at some but not all of the plural base stations without requiring measurement of the communication signals between the plural base stations and the mobile-appliance (see col. 5, lines 22-25 and col. 10, lines 41-46).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 4 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Hawkes et al., U.S. Patent Number 5,973,643 (hereafter Hawkes)** as applied to claims 3 and 10 above, and further in view of **Leblanc et al., U.S. Patent Number 5,960,341 (hereafter Leblanc).**

Regarding claim 4, Hawkes teaches all the limitations of claim 3. Hawkes does not specifically teach a method, wherein the estimated signal propagation is a function of the topology and morphology of the coverage area and a function of a propagation loss model.

Leblanc, however, discloses a method to diagram and model the RF propagation loss from a given base station/radio port, for various RF measurement arc segments, which will define entire contours (see col. 23, lines 46-50). Unfortunately, the principle of free space loss rarely exists when attempting to predict base station coverage areas since the surrounding buildings, trees, traffic signs and other geographical "clutter" blocks transmitted signals (see col. 23, lines 60-63). To account for these variables involved in propagation prediction, the present invention utilizes a number of segmented models and analysis techniques for data reduction purposes (see col. 23, lines 63-67). Leblanc further discloses a network topology may change due to a variety of reasons (see col. 24, lines 56-57). Thus, using the various RF propagation models and special plane curves, propagation coverage will be predicted for all base stations by examining the placement of the base stations, local street widths, the surrounding clutter and this provides a quick, inexpensive estimate of each base station's coverage (see col. 25, lines 34-39).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include a method, wherein the estimated signal propagation is a function of the topology and morphology of the coverage area and a function of a propagation loss model as taught by Leblanc, for the method

and apparatus for mobile emitter location by Hawkes to predict the propagation coverage for all base stations to determine their placement.

Regarding claim 11, Hawkes teaches all the limitations of claim 10. Hawkes does not teach a method, wherein the estimated accuracy for the plural selected geographic points is plotted as accuracy contour lines on a geographic plot of the coverage area.

Leblanc, however, discloses a method of plotting accuracy contour lines on a geographic plot of the coverage area, for selected geographic points as shown in Figures 25-28.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include a method, wherein the estimated accuracy for the plural selected geographic points is plotted as accuracy contour lines on a geographic plot of the coverage area as taught by Leblanc, for the method and apparatus for mobile emitter location by Hawkes to define a bounding polygon area that describes the position of a mobile-appliance in terms of minimum and maximum error estimates.

6. Claims 7-9, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Hawkes et al., U.S. Patent Number 5,973,643 (hereafter Hawkes).**

Regarding claims 7 and 17, Hawkes teaches all the limitations of claims 6 and 16. Hawkes, however, discloses a method of combining the technique of time-difference-of-arrival (TDOA) and angle-of-arrival (AOA), with measurements of signal strength (see col. 3, lines 38-40). Hawkes discloses distinct advantages

to having mobile location sensors capable of both time-of-arrival (TOA) and (AOA) measurements for mobile cellular telephone location (see col. 4, lines 28-31). Hawkes, further, discloses TOA location systems require the cellular telephone to be received by three or more location sites, while AOA requires two, to improve location accuracy (see col. 4, lines 31-34) and mobile location sensor RF signals are acquired from the same antennas used by the base station (see col. 5, lines 19-21 and Fig. 1; where antennas 20a, 20b and 20c are shown at the base stations, indicating use of more than one channel in determining time difference of arrival).

Hawkes, does not specifically teach a method, wherein the capability of the mobile location determining sensors includes (a) a two-channel time difference of arrival determination capability, (b) a four-channel time-difference of arrival determination capability, and (c) a four-channel time difference of arrival combined with an angle of arrival determination capability.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include a method, wherein the capability of the mobile location determining sensors includes (a) a two-channel time difference of arrival determination capability, (b) a four-channel time-difference of arrival determination capability, and (c) a four-channel time difference of arrival combined with an angle of arrival determination capability as taught by Hawkes, to allow the mobile-appliance to be located with more precision.

Regarding claim 8, Hawkes teaches all the limitations of claim 7. In addition, Hawkes teaches a method, wherein the capability of the mobile-

appliance location determining sensor is a function of the cost of the location sensor (see col. 4, lines 9-25).

Regarding claim 9, Hawkes teaches all the limitations of claim 8. In addition, Hawkes teaches a method, wherein the step of determining the position of the mobile-appliance location determining sensors includes the step of selecting location determining sensors having a combination of capabilities that meets a predetermined accuracy at the lowest cost (see col. 11, lines 33-51).

***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hawkes et al., U.S. Patent Number 6,201,499 discloses a time difference of arrival measurement system.

Minter et al., U.S. Patent Number 6,407,703 discloses a multi-platform geolocation method and system.

Chinoy et al., U.S. Patent Number 6,771,969 discloses an apparatus and method for tracking and communicating with a mobile radio unit.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony S Addy whose telephone number is 703-305-8487. The examiner can normally be reached on Mon-Fri 8:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David R Hudspeth can be reached on 703-308-4825.

The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Anthony S. Addy
August 16, 2004

ERIKA GAY
PATENT EXAMINER